| Symbol | Quantity | g/mol ($10^{-3}$ kg·mol$^{-1}$) |
|---|---|---|
| $M_N$ | molar mass of atomic nitrogen | 14.0067 |
| $M_{N2}$ | molar mass of molecular nitrogen | 28.0134 |
| $M_{NMHC}$ | effective molar mass of nonmethane hydrocarbon[2] | 13.875389 |
| $M_{NMHCE}$ | effective molar mass of nonmethane equivalent hydrocarbon[2] | 13.875389 |
| $M_{NOx}$ | effective molar mass of oxides of nitrogen[3] | 46.0055 |
| $M_{N2O}$ | effective molar mass of nitrous oxide | 44.0128 |
| $M_O$ | molar mass of atomic oxygen | 15.9994 |
| $M_{O2}$ | molar mass of molecular oxygen | 31.9988 |
| $M_{C3H8}$ | molar mass of propane | 44.09562 |
| $M_S$ | molar mass of sulfur | 32.065 |
| $M_{THC}$ | effective molar mass of total hydrocarbon[2] | 13.875389 |
| $M_{THCE}$ | effective molar mass of total hydrocarbon equivalent[2] | 13.875389 |

[1] See paragraph (f)(1) of this section for the composition of dry air
[2] The effective molar masses of THC, THCE, NMHC, and NMHCE are defined by an atomic hydrogen-to-carbon ratio, α, of 1.85
[3] The effective molar mass of NOx is defined by the molar mass of nitrogen dioxide, $NO_2$

(3) This part uses the following molar gas constant for ideal gases:

| Symbol | Quantity | J/(mol) · K) ($m^2 \cdot kg \cdot s^{-2}$ $mol^{-1} \cdot K^{-1}$) |
|---|---|---|
| $R$ | molar gas constant | 8.314472 |

(4) This part uses the following ratios of specific heats for dilution air and diluted exhaust:

| Symbol | Quantity | [J/(kg·K)]/ [J/(kg·K)] |
|---|---|---|
| $\gamma_{air}$ | ratio of specific heats for intake air or dilution air. | 1.399 |
| $\gamma_{dil}$ | ratio of specific heats for diluted exhaust. | 1.399 |
| $\gamma_{exh}$ | ratio of specific heats for raw exhaust. | 1.385 |

(g) *Other acronyms and abbreviations.* This part uses the following additional abbreviations and acronyms:

ASTM American Society for Testing and Materials.
BMD bag mini-diluter.
BSFC brake-specific fuel consumption.
CARB California Air Resources Board.
CFR Code of Federal Regulations.
CFV critical-flow venturi.
CI compression-ignition.
CITT Curb Idle Transmission Torque.
CLD chemiluminescent detector.
CVS constant-volume sampler.
DF deterioration factor.
ECM electronic control module.
EFC electronic flow control.
EGR exhaust gas recirculation.
EPA Environmental Protection Agency.
FEL Family Emission Limit
FID flame-ionization detector.
GC gas chromatograph.
GC–ECD gas chromatograph with an electron-capture detector.
IBP initial boiling point.
ISO International Organization for Standardization.
LPG liquefied petroleum gas.
NDIR nondispersive infrared.
NDUV nondispersive ultraviolet.
NIST National Institute for Standards and Technology.
PDP positive-displacement pump.
PEMS portable emission measurement system.
PFD partial-flow dilution.
PMP Polymethylpentene.
pt. a single point at the mean value expected at the standard.
PTFE polytetrafluoroethylene (commonly known as Teflon™).
RE rounding error.
RMC ramped-modal cycle.
RMS root-mean square.
RTD resistive temperature detector.
SSV subsonic venturi.
SI spark-ignition.
UCL upper confidence limit.
UFM ultrasonic flow meter.
U.S.C. United States Code.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37346, June 30, 2008; 73 FR 59342, Oct. 8, 2008; 74 FR 56518, Oct. 30, 2009]

### § 1065.1010 Reference materials.

Documents listed in this section have been incorporated by reference into this part. The Director of the Federal Register approved the incorporation by reference as prescribed in 5 U.S.C. 552(a) and 1 CFR part 51. Anyone may inspect copies at the U.S. EPA, Air and Radiation Docket and Information

Center, 1301 Constitution Ave., NW., Room B102, EPA West Building, Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

(a) *ASTM material.* Table 1 of this section lists material from the American Society for Testing and Materials that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the American Society for Testing and Materials, 100 Barr Harbor Dr., P.O. Box C700, West Conshohocken, PA 19428 or *www.astm.com*. Table 1 follows:

TABLE 1 OF § 1065.1010.–ASTM MATERIALS

| Document No. and name | Part 1065 reference |
|---|---|
| ASTM D86–07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure | 1065.703, 1065.710 |
| ASTM D93–07, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester | 1065.703 |
| ASTM D445–06, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity) | 1065.703 |
| ASTM D613–05, Standard Test Method for Cetane Number of Diesel Fuel Oil | 1065.703 |
| ASTM D910–07, Standard Specification for Aviation Gasolines | 1065.701 |
| ASTM D975–07b, Standard Specification for Diesel Fuel Oils | 1065.701 |
| ASTM D1267–02 (Reapproved 2007), Standard Test Method for Gage Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method) | 1065.720 |
| ASTM D1319–03, Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption | 1065.710 |
| ASTM D1655–07e01, Standard Specification for Aviation Turbine Fuels | 1065.701 |
| ASTM D1837–02a (Reapproved 2007), Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases | 1065.720 |
| ASTM D1838–07, Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases | 1065.720 |
| ASTM D1945–03, Standard Test Method for Analysis of Natural Gas by Gas Chromatography | 1065.715 |
| ASTM D2158–05, Standard Test Method for Residues in Liquefied Petroleum (LP) Gases | 1065.720 |
| ASTM D2163–05, Standard Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propene Concentrates by Gas Chromatography | 1065.720 |
| ASTM D2598–02 (Reapproved 2007), Standard Practice for Calculation of Certain Physical Properties of Liquefied Petroleum (LP) Gases from Compositional Analysis | 1065.720 |
| ASTM D2622–07, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry | 1065.703, 1065.710 |
| ASTM D2713–91 (Reapproved 2001), Standard Test Method for Dryness of Propane (Valve Freeze Method) | 1065.720 |
| ASTM D2784–06, Standard Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp) | 1065.720 |
| ASTM D2880–03, Standard Specification for Gas Turbine Fuel Oils | 1065.701 |
| ASTM D2986–95a (Reapproved 1999), Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test | 1065.170 |
| ASTM D3231–07, Standard Test Method for Phosphorus in Gasoline | 1065.710 |
| ASTM D3237–06e01, Standard Test Method for Lead in Gasoline By Atomic Absorption Spectroscopy | 1065.710 |
| ASTM D4052–96e01 (Reapproved 2002), Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter | 1065.703 |
| ASTM D4814–07a, Standard Specification for Automotive Spark-Ignition Engine Fuel | 1065.701 |
| ASTM D5186–03, Standard Test Method for Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels By Supercritical Fluid Chromatography | 1065.703 |
| ASTM D5191–07, Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method) | 1065.710 |
| ASTM D5797–07, Standard Specification for Fuel Methanol (M70–M85) for Automotive Spark-Ignition Engines | 1065.701 |
| ASTM D5798–07, Standard Specification for Fuel Ethanol (Ed75–Ed85) for Automotive Spark-Ignition Engines | 1065.701 |
| ASTM D6615–06, Standard Specification for Jet B Wide-Cut Aviation Turbine Fuel | 1065.701 |
| ASTM D6751–07b, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels | 1065.701 |
| ASTM D6985–04a, Standard Specification for Middle Distillate Fuel Oil—Military Marine Applications | 1065.701 |
| ASTM F1471–93 (Reapproved 2001), Standard Test Method for Air Cleaning Performance of a High-Efficiency Particulate Air Filter System | 1065.1001 |

(b) *ISO material.* Table 2 of this section lists material from the International Organization for Standardization that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this part where we reference it. Anyone may purchase copies of these materials from the International Organization for Standardization, Case Postale 56,

CH–1211 Geneva 20, Switzerland or *www.iso.org*. Table 2 follows:

TABLE 2 OF § 1065.1010—ISO MATERIALS

| Document No. and name | Part 1065 reference |
|---|---|
| ISO 2719:2002, Determination of flash point—Pensky-Martens closed cup method | 1065.705 |
| ISO 3016:1994, Petroleum products—Determination of pour point | 1065.705 |
| ISO 3104:1994/Cor 1:1997, Petroleum products—Transparent and opaque liquids—Determination of kinematic viscosity and calculation of dynamic viscosity | 1065.705 |
| ISO 3675:1998, Crude petroleum and liquid petroleum products—Laboratory determination of density—Hydrometer method | 1065.705 |
| ISO 3733:1999, Petroleum products and bituminous materials—Determination of water—Distillation method | 1065.705 |
| ISO 6245:2001, Petroleum products—Determination of ash | 1065.705 |
| ISO 8217:2005, Petroleum products—Fuels (class F)—Specifications of marine fuels | 1065.705 |
| ISO 8754:2003, Petroleum products—Determination of sulfur content—Energy-dispersive X-ray fluorescence spectrometry | 1065.705 |
| ISO 10307–2:1993, Petroleum products—Total sediment in residual fuel oils—Part 2: Determination using standard procedures for ageing | 1065.705 |
| ISO 10370:1993/Cor 1:1996, Petroleum products—Determination of carbon residue—Micro method | 1065.705 |
| ISO 10478:1994, Petroleum products—Determination of aluminium and silicon in fuel oils—Inductively coupled plasma emission and atomic absorption spectroscopy methods | 1065.705 |
| ISO 12185:1996/Cor 1:2001, Crude petroleum and petroleum products—Determination of density—Oscillating U-tube method | 1065.705 |
| ISO 14596:2007, Petroleum products—Determination of sulfur content—Wavelength-dispersive X-ray fluorescence spectrometry | 1065.705 |
| ISO 14597:1997, Petroleum products—Determination of vanadium and nickel content—Wavelength-dispersive X-ray fluorescence spectrometry | 1065.705 |
| ISO 14644–1:1999, Cleanrooms and associated controlled environments | 1065.190 |

(c) *NIST* material. Table 3 of this section lists material from the National Institute of Standards and Technology that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this part where we reference it. Anyone may purchase copies of these materials from the Government Printing Office, Washington, DC 20402 or download them free from the Internet at *www.nist.gov*. Table 3 follows:

TABLE 3 OF § 1065.1010—NIST MATERIALS

| Document No. and name | Part 1065 reference |
|---|---|
| ISONIST Special Publication 811, 1995 Edition, Guide for the Use of the International System of Units (SI), Barry N. Taylor, Physics Laboratory. | 1065.20, 1065.1001, 1065.1005 |
| NIST Technical Note 1297, 1994 Edition, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, Barry N. Taylor and Chris E. Kuyatt. | 1065.1001 |

(d) *SAE material.* Table 4 of this section lists material from the Society of Automotive Engineering that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096 or *http://www.sae.org*. Table 4 follows:

TABLE 4 OF § 1065.1010—SAE MATERIAL

| Document number and name | Part 1065 reference |
|---|---|
| "Optimization of Flame Ionization Detector for Determination of Hydrocarbon in Diluted Automotive Exhausts," Reschke Glen D., SAE 770141 | 1065.360 |

(e) *California Air Resources Board material.* Table 5 of this section lists material from the California Air Resources Board that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may get copies of these materials from the California Air Resources Board, 9528 Telstar Ave., El Monte, California 91731. Table 5 follows:

TABLE 5 OF § 1065.1010—CALIFORNIA AIR RESOURCES BOARD MATERIALS

| Document No. and name | Part 1065 reference |
|---|---|
| "California Non-Methane Organic Gas Test Procedures," Amended July 30, 2002, Mobile Source Division, California Air Resources Board | 1065.805 |

(f) *Institute of Petroleum material.* Table 6 of this section lists the Institute of Petroleum standard test methods material from the Energy Institute that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this part where we reference it. Anyone may purchase copies of these materials from the Energy Institute, 61 New Cavendish Street , London, W1G 7AR, UK , +44 (0)20 7467 7100 or *www.energyinst.org.uk*. Table 6 follows:

TABLE 6 OF § 1065.1010—INSTITUTE OF PETROLEUM MATERIALS

| Document No. and name | Part 1065 reference |
|---|---|
| IP–470, Determination of aluminum, silicon, vanadium, nickel, iron, calcium, zinc, and sodium in residual fuels by atomic absorption spectrometry | 1065.705 |
| IP–500, Determination of the phosphorus content of residual fuels by ultra-violet spectrometry | 1065.705 |
| IP–501, Determination of aluminum, silicon, vanadium, nickel, iron, sodium, calcium, zinc and phosphorus in residual fuel oil by ashing, fusion and inductively coupled plasma emission spectrometry | 1065.705 |

[73 FR 37347, June 30, 2008, as amended at 73 FR 59343, Oct. 8, 2008]

# PART 1068—GENERAL COMPLIANCE PROVISIONS FOR ENGINE PROGRAMS

## Subpart A—Applicability and Miscellaneous Provisions

Sec.



## Subpart B—Prohibited Actions and Related Requirements